

### REMARKS

The drawings were objected for failure to have reference characters 10 and 48 therein. Applicant has amended the Figures to include these reference characters. The mere addition of these two reference characters does not add new matter as the elements are shown in the Figures and the discussed in the specification. Therefore, Applicant respectfully traverses this objection.

The specification of the patent application was objected to because the title was not descriptive. Applicant has amended the title of the invention such that it is more descriptive. Therefore, Applicant respectfully traverses this objection.

The specification was also objected to due to typos on various pages. Applicant has submitted a substitute specification that eliminates all typographical errors. Therefore, Applicant respectfully traverses this objection.

Claims 7 through 10 and 17 through 20 are object to because they are improper form due to their respective multiple dependencies. Applicant has cancelled these claims rendering the objections thereto moot.

Claims 1 through 20 have been rejected in the above-mentioned office action. Applicant has cancelled all of these claims. Further, Applicant has added fifteen new claims, claims 21 through 35. Of these claims, claims 21 and 35 are in independent form.

By way of background, Applicant's invention is directed to a piston pump that is particularly, though not exclusively, suited to be driven from a solar power source. As described under the "Background Art" section of the description of Applicant's specification, piston pumps have been used when driven by a wind mill for pumping water from bores. Further, most piston pumps have an unbalanced power requirement between the first and second strokes of the drive shaft, i.e. the down strokes and up strokes of the drive shaft.

However, Applicant's invention addresses this deficiency in such prior art piston pumps so as to make them suitable to be driven by a solar power source. In particular, the cross-section at area of the drive shaft is approximately the same as the cross-sectional area between the drive shaft and the

housing. This feature is recited in claim 21, filed herewith. In addition to this, the piston pump of the present invention has a novel drive mechanism. This drive mechanism has been developed to ensure smooth operation given that the pump is being operated electrically by a motor, which may be solar powered. In this set-up, it is also important that the drive shaft reciprocates linearly so that the seal is maintained in sealing contact with the interior surface of the housing so as to ensure that there is no fluid communication between the first and second chambers, which are on either side of the seal. This also ensures that substantially equal volumes of liquid are disposed in the downstrokes and upstrokes of the drive shaft. The drive mechanism of the present invention does this by having a crank arm connected, at one end, to a crank driven by the motor, and having its other end operatively connected to the drive shaft in a manner to ensure that no sideways motion is imparted to the drive shaft. This is done by having a longitudinally extending member which extends parallel to the direction of the reciprocal motion of the drive shaft. A connector, being wheel 82 in the preferred embodiment, connects the crank arm with the drive shaft and it is constrained by the longitudinally extending member and movable therealong such that this arrangement ensures the movement of the crank arm does not impart any substantial movement to the drive shaft in the direction sideways to the direction of reciprocal motion of the drive shaft. In this way, the drive shaft moves substantially linearly.

Claims 1 and 11 were rejected under 35 U.S.C. § 102(b) as being anticipated by United States Patent 1,756,795 (the “ ’795 reference”). Applicant respectfully traverses this rejection. The ’795 reference discloses an oil pump that includes a sleeve 35 that covers a piston body 29, 35. The ’795 reference does not disclose a drive means or a constraining means.

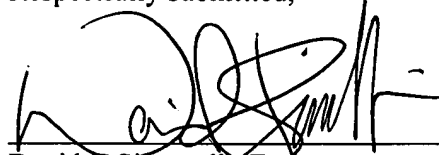
Claims 21 and 35 specifically set forth a drive means and a constraining means. In addition, these elements are set forth expressly. Therefore, Applicant asserts that claims 21 and 35 overcome the rejection under 35 U.S.C. § 102(b).

It is to be noted that none of the prior art documents disclose a drive mechanism of this type. **AU75333/96** simply discloses a hand-operated mechanism having user-operated handle 6 attached to the upper part of the pump shaft 4. There is no disclosure of the drive mechanism of the type which is recited in claim 1. **FR27008209** discloses a hand operated drive mechanism whereby a user-operated handle 15 is used in an upward and downward arc to cause reciprocal motion of the drive shaft. Again, there is no disclosure of the drive mechanism of the type which was recited in claim 1 of the applicant’s application.

Amendment  
Serial No. 09/831,615

It is respectfully submitted that this patent application is in condition for allowance, which allowance is respectfully solicited. If the Examiner has any questions regarding this amendment or patent application, the Examiner is invited to contact the undersigned.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'David J. Simonelli', is written over a horizontal line.

David J. Simonelli, Esq.  
(Reg. No. 36,680)  
Clark Hill PLC  
500 Woodward Avenue, Suite 3500  
Detroit, MI 48226-3435  
(313) 965-8667

**Date:** June 3, 2005

Attorney Docket No: 19724-087004